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India: Utilizing Biofuels to Promote Women's Status and Food Security

Introduction

You can tell the condition of a nation by looking at the status of its women.
-Jawaharlal Nehru

Since India's declaration of independence from Great Britain on August 15, 1947, the country has become one of the fastest growing economies, along with a rapid increase in population. Although India has experienced considerable success, poverty and malnutrition, especially in rural areas, remains. Half of the world's hungry, three hundred and fifty million, reside in India, and many of those affected are women and children. India is considered part of the Indian Subcontinent in southern Asia, displaying a variety of climates ranging from desert to subtropical to rainforest. It is the seventh-largest country in the world, covering over one point two million square miles and is home to over one billion people, seventy percent of whom live in villages.

India is the largest democracy in the world, and defined by its constitution as a sovereign, socialist, secular, democratic republic. Nonetheless, discrimination persists within this democracy, as seen in caste systems and gender inequalities. These castes are defined by hereditary groups, or jātis ("Poverty in India"). In urban areas they have been followed less stringently, while rurally, they continue to be rigid. In addition, women are in a disadvantaged position, plagued by illiteracy, powerlessness, and financial instability. A woman's role in agriculture is vital to the success of the family farm, and thus should be acknowledged through land ownership and government recognition. Prejudices towards women impede the advancement of society and ultimately the success of a family. Agriculture employs sixty percent of the workforce, yet contributes less than a third of the Gross National Product (GNP). The service industry, in contrast, composes only a quarter of the workforce yet is the major source of growth in the economy. While other areas of business are booming, farming has not matched such substantial increases.

Family Farm

Most of India's farms are defined as subsistence, where food is produced solely for survival, not profit. In general, a small-sized family farm is around one and a half hectares, or a little less than four acres, rarely allowing for a surplus to sell, stunting progress ("Smallholder Farmers"). In essence, the family must rely only on what it can produce. Much of the farmland is located in the Gangetic Plain, which is filled with a variety of water systems including the Ganges and Indus rivers. The movement towards success in farming is plagued by socio-economic handicaps, illiteracy, and a host of natural disasters such as monsoons and droughts. Most planting and harvesting continues to be done by hand, with the entire family unit making contributions. Men work mainly in the fields, but women do play a significant role in the planting and cultivating of rice. Women gather water and fuel, cook meals, and tend to livestock, usually one or two cows. Methods have remained stagnant because of the impracticable and unaffordable costs technology requires. Irrigation has not been utilized, which is apparent in the 2000-2001 growing season here less than fifty-four percent of the land was irrigated ("Agriculture in India"). The burden of water, then, lies in the monsoon season, where the amount of rainfall determines the success of a crop.

Main crop seasons for India are called the kharif, rabi, and summer and during each period specific crops are grown ("India Agriculture"). During the summer, rice, maize and groundnut are grown; in rabi, jowar, rapeseed, mustard, barley, gram, wheat, and linseed; and in kharif, rice, cotton, jowar, sesame, bajra, maize, groundnut, and sugarcane. India, as a whole, is the world's top producer for milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper. The country is also the second largest producer of wheat, rice, sugar, groundnut and inland fish. Rural farmers struggle with access to (crop) markets because of inadequate roads, high cost of transportation, and little technology. Although the technology and communication sector has improved, more effort must be made to ensure marketability and profitability of crops.

While family structures in India differ between urban and rural, wealthy and poor, many include several generations living under one roof. In a village setting, a woman typically moves to her husband's village following marriage, where they live with his family and relatives. Most villages are composed of one hundred to two hundred families in an area of two hundred and fifty hectares (620 acres). In a farming household, the family consists of five or six people ("Falling Farm Incomes"). On average, a woman has two or three children, but the number substantially increases in impoverished rural areas due to lack of birth control. As the income decreases, the number of family members increases. Per capita income for rural and village dwellers is only USD 240-360, or for example, a family of five existing on a mere \$1200 a year.

In India, an estimated two hundred and thirty-three million are malnourished, with the majority living in villages and on farms. The lower third of Indian society has a calorie intake of less than 1,700 kilo calories a day, even if they spend up to seventy percent of their income on food ("Gunyon, Bill"). Food insecurity is still prevalent, especially among young children, where almost half experience malnourishment. Meals that are prepared consist of a staple grain – either rice or wheat. Along with this grain, spices add flavor, and lentils and pod vegetables are cooked. Seldom do Indians consume meat since many are vegetarians. Vegetables are only those grown in season, and when food becomes a scarcity, and often it does, few spices are added, and grains must suffice, creating a bland meal lacking vital nutrients.

Education

Education of children became the responsibility of the states and Centre in India after 1976. Under the country's constitution, every child has the fundamental right to education, one that is free and compulsory for those aged six to fourteen. However, these government plans have not reached all facets in its society; the illiteracy rate proves much needs to be done if all rural children are to have access to primary schools. Half of the female populace is still illiterate, and a large gap endures between the male and female populations. The rural-urban disparity is no better – the state of Kerala maintains the highest literacy rate at ninety percent, while in Bihar, it is only forty-seven percent. Bihar's district, Kishanganj, has the lowest literacy rate in the country, at eighteen and one half percent for women and thirty-one percent for men ("Literacy in India").

Parents of females are often reluctant to agree to the education of their daughters because there are no incentives for the family. Responsibilities at home and in the field prevent young girls from going to school, and countless villages have no school at all to attend. Hours of attendance cannot be worked around the schedule of a working girl, and educational funds are being reduced, which only worsens the situation. Availability of agricultural education is limited as well. Extension programs, which communicate and teach new agricultural techniques and technology, reach a mere five percent of female farmers worldwide, though women make up the brunt of agricultural labor force ("India Agriculture"). Furthermore, productivity does not increase, leaving female subsistence farmers in the dust. Governments and other agencies have failed to identify and acknowledge women as prominent players in

agriculture, and thus females are being left out from these extension programs. Women are simply not receiving the information necessary to better agricultural output, which in turn hinders profits and, most importantly, the nourishment of their families.

Role of Women

The women of India face several obstacles in maintaining food security and the livelihood of their families. Education is the foremost problem hindering the success of impoverished and malnourished Indian women. There is a direct correlation between the amount of schooling and malnutrition amongst girls: where education opportunity is limited, hunger is prevalent. With primary education, agricultural output could increase substantially, up to twenty-four percent (“Gender and Education”). In a family, the woman is responsible for the nutrition and overall well-being of her family. Yet continually, she places her own welfare last, feeding the males in the household first and, according to one study conducted in Punjab, taking in 1,000 fewer calories than her male counterpart (“Coonrod, Carol”). Malnourishment produces devastating effects on the health of a female, in particular anemia and stunted growth. In addition, women are often disinclined to admit sickness and will prolong treatment until sometimes, it is too late. Discrimination is even evident at the infant level, where a mother breastfeeds her daughter less than a son, showing the preferential status of males. This disparity extends to adulthood, where the gender ratio is one of the lowest in the world, with 927 females for every 1,000 males.

Although India has made drastic improvements in education and gender equality since it became an independent nation, there is still a long way to go. In 1947, the female literacy rate stood at eight percent but has increased significantly to over fifty percent today. However, this is well below the average of developing countries, which worldwide is over seventy percent. In the past two decades, literacy rates have not risen proportionally compared to the first two decades of self-government. Infant and maternal mortality rates are both greater than these same rates in developing countries. Low birth rates are more than triple the developing world’s average; one in three babies born in India are underweight. Mothers who are illiterate have children who are twice as likely to be underweight and underfed; strong ties bind education and nourishment (“Adlaka, Arjun and Velkoff, Victoria A”). How can the vicious cycle of undernourishment be stopped when, from birth, the Indian population is already at a disadvantage? The answer lies in education – it is the perpetuating factor of success or failure in Indian women and families. With education comes greater income, which in turn provides food security, encouragement of good health, a higher quality of life, and the eradication of poverty.

The Indian government has successfully incorporated women into politics, with a law stating that a third of all seats in elected bodies are reserved for women. Almost half of these seats are filled by females who are both poor and illiterate, hailing from rural villages across the states. In fact, over one million women have entered these government positions. Though great strides have been made in the economic and political realm, social and cultural prejudices still exist. Caste systems were officially banned, but rural areas uphold many of the practices, a disadvantage for many women and Scheduled Castes and Tribes.

Women are taught to feel inferior and obedient to men, and this traditional mode of thought creates a presence of fear. Violence against females, ranging from physical or sexual abuse to sex-selective abortions or infanticides, is disturbingly common. Most cases of rape, harassment, or molestation go unreported and the guilty are never charged. Dowries have been prohibited since 1961, but are still used as payment for a spouse in India. The incessant demands of dowry by a husband’s family on his wife in the first several years of marriage have resulted in 6,000 murders a year (“Coonrod, Carol”). In addition to dowries, women have little say in inheritance and divorce, and they are virtually powerless in marriages. A wife’s main goal is to bear healthy sons for her husband, which is essentially the only way to raise her status in her husband’s household. An Indian woman exercises little control

over her own life, being ruled by her father, then her husband, and finally her sons. Women alone can do little to fight these seemingly “superior” males in households; government policies in India must be enforced, and more attention must be paid, to empower women and create gender equality.

Biofuels

The promises of biofuels in India are far-reaching and are necessary sources of energy as the population increases and nonrenewable fuel sources are strained. Biofuels are derived from biomass, which is organic matter – in other words, plant material or animal waste. In India, the key to energy independence by 2012 lies in the production of bio-ethanol and biodiesel. Ethanol is produced from sugar, where its carbohydrates are fermented to molasses. Success of bio-ethanol is already apparent in the endorsement of five percent ethanol-blended petrol by the Indian Government, to be used in nine states. The second and third phases of this blending will expand to all of India, and subsequently be increased to a ten percent blend.

Dr. Abdul Kalam, the former President of India, is a vocal leader in the implementation of *Jatropha* cultivation (“*Jatropha* Incentives in India”). The *Jatropha curcas*, more specifically the oil produced from its seeds, is used to make bio-diesel. These seeds are non-edible and thus do not have to be utilized for both biofuels and nourishment. Therefore no competition exists between nourishment, a primary need, and energy, a lesser need. This particular plant is very well-suited to the country, as it can grow in very poor areas, such as wastelands and deserts, and can survive harsh weather conditions. *Jatropha* can survive with little water and in the warm, tropical climates of India, reducing the dependence on foreign crude oil. Biofuels would create more employment opportunities, along with supplying the energy required for a prospering country. It promotes organic farming, increases nutrients in the soil, and is non-toxic and biodegradable, as biofuels cut down on the emission of harmful pollutants.

In the developing world, energy from biomass (e.g. wood and charcoal) is gathered mostly by women. Though they perform this crucial job, they are largely ignored when developments are made in the energy sector. In essence, because of their lower status in society, Indian women are not taken seriously despite the fact they have a considerable role in energy. Few policies that include women have yet to be implemented. This deters economic prosperity because the women must spend so much time searching for and gathering fuel towards their family’s survival. Instead, the government must rid itself of “gender-blind” procedures and advocate for the involvement of women in new enterprises. With the planting of biofuels such as *Jatropha*, new jobs in rural areas will emerge and incomes will increase with greater efficiency and diversity of agricultural production.

If a woman’s position as an energy provider is comprised of the distribution, management, and building of plantations and fuel, a greater sense of self-worth and confidence will better her status in society. Females will be able to take charge of their livelihoods, becoming independent and empowered. Not only would women help themselves, but they would also make major contributions to the livelihood of their families and villages (“Karlsson, Gail”). Rural farmers, by producing their own biofuel, would not need to spend money on the fuel used for transportation to the market. Additionally, it would become more affordable to take crops to the marketplace, leading to greater profits. The development of biofuels for farmers lowers the risk and diversifies their investments, creating flexibility and more crops for rotation (“Laney, Kara”). When food security ceases to be an issue, women and their families can turn their attention to their health and focus on education and advancement in society.

Recommendations, Suggestions, Conclusions

The challenge of meeting India’s energy requirements does not lie exclusively in development, but also lies in the cooperation of government and people to address the implementation of biofuels. As

population and urban growth occurs, so too does the dependency on India's transportation sector. The use of automobiles is expanding, yet the country remains dependent on crude oil and petrol imports for seventy-five percent of its energy needs. Independence from foreign oil imports can only be reached through India's own production of fuel, particularly biofuels.

The government, acknowledging the growing significance of biofuels, has created a National Ministry dedicated to it. Obstructions do exist, including inadequate pricing of biodiesels and current high production costs. However, the national government recently set, in 2005, a price of US\$.56 per liter for obtaining bio-diesel removed from non-edible oilseeds for mixing into diesel. In addition, the excise duty on biofuels was changed to near zero, and a more favorable sales tax was applied ("Lele, Satish"). The Indian government is also using private businesses for subsidies and financial support. With this unification of business and government, food security in India, and the rest of the world, will succeed.

Along with local governments, industrialized nations must assist financially and democratically. The United States, along with other world powers such as Japan, Canada, and the European Union, need to realize the importance of eliminating hunger worldwide in a timely fashion by placing it on the top of international agendas. Addressing discrimination – based on gender, ethnicity, or religion – is a crucial step towards food security. Currently, the United States pours hundreds of billions of dollars into defense, but only spends a fraction, one point two billion dollars on combating world hunger (McGovern, 14). Along with monetary support, nations need to cut their own dependency on nonrenewable sources, such as fossil fuels, and amplify research and development of biofuels. Biofuels will not only help the environment but will also improve the quality of life for millions of people.

India's national government has realized the promise of biofuels for its inhabitants, but needs to proceed with greater urgency and fervor. It is imperative that other national governments embrace biofuels and adapt them to their own energy needs as well. According to George McGovern, the two most powerful tools to alleviate hunger and poverty are democracy and education (McGovern, 16). Working together with other nations, India will be able to eradicate hunger and poverty and become self-sufficient in fulfilling its energy requirements. As a global community consuming more energy and food each day, the world must become aware of the seemingly 'invisible' poor who lack nourishment and fuel. Greater focus needs to be given to women and children, particularly in education and agriculture. With the riddance of gender bias in society and the home, more opportunities will be present for food and energy. We must shift from a 'me-first' to 'others-first' mentality; one where all of humanity will gain access to precious freedoms which so few of us can enjoy today – food and energy security.

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